

terminal group, such internucleoside linkage or 5'-terminal group optionally including the substituent  $R^5$ ;

one of the substituents  $R^2$ ,  $R^{2*}$ ,  $R^3$ , and  $R^{3*}$  is a group  $P^*$  which designates an internucleoside linkage to a preceding monomer, or a 3'-terminal group;

one or two pairs of non-geminal substituents selected from the substituents of  $R^{1*}$ ,  $R^{4*}$ ,  $R^5$ ,  $R^{5*}$ ,  $R^6$ ,  $R^{6*}$ ,  $R^7$ ,  $R^{7*}$ ,  $R^{N*}$ , and the ones of  $R^2$ ,  $R^{2*}$ ,  $R^3$ , and  $R^{3*}$  not designating  $P^*$  each designates a biradical consisting of 1-8 groups or atoms selected from  $-C(R^aR^b)-$ ,  $-C(R^a)=C(R^a)-$ ,  $-C(R^a)=N-$ ,  $-O-$ ,  $-Si(R^a)_2-$ ,  $-S-$ ,  $-SO_2-$ ,  $-N(R^a)-$ , and  $>C=Z$ ,

wherein Z is selected from  $-O-$ ,  $-S-$ , and  $-N(R^a)-$ , and  $R^a$  and  $R^b$  each is independently selected from hydrogen, optionally substituted  $C_{1-12}$ -alkyl, optionally substituted  $C_{2-12}$ -alkenyl, optionally substituted  $C_{2-12}$ -alkynyl, hydroxy,  $C_{1-12}$ -alkoxy,  $C_{2-12}$ -alkenyloxy, carboxy,  $C_{1-12}$ -alkoxycarbonyl,  $C_{1-12}$ -alkylcarbonyl, formyl, aryl, aryloxy-carbonyl, aryloxy, arylcarbonyl, heteroaryl, heteroaryloxy-carbonyl, heteroaryloxy, heteroarylcarbonyl, amino, mono- and di( $C_{1-6}$ -alkyl)amino, carbamoyl, mono- and di( $C_{1-6}$ -alkyl)-amino-carbonyl, amino- $C_{1-6}$ -alkyl-aminocarbonyl, mono- and di( $C_{1-6}$ -alkyl)amino- $C_{1-6}$ -alkyl-aminocarbonyl,  $C_{1-6}$ -alkyl-carbonylamino, carbamido,  $C_{1-6}$ -alkanoyloxy, sulphonyl,  $C_{1-6}$ -alkylsulphonyloxy, nitro, azido, sulphonyl,  $C_{1-6}$ -alkylthio, halogen, DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands, where aryl and heteroaryl may be optionally substituted, and where two geminal substituents  $R^a$  and  $R^b$  together may designate optionally substituted methylene ( $=CH_2$ ), and wherein two non-geminal or geminal substituents selected from  $R^a$ ,  $R^b$ , and any of the substituents  $R^{1*}$ ,  $R^2$ ,  $R^{2*}$ ,  $R^3$ ,  $R^{3*}$ ,  $R^{4*}$ ,  $R^5$ ,  $R^{5*}$ ,  $R^6$  and  $R^{6*}$ ,  $R^7$ , and  $R^{7*}$  which are present and not involved in  $P$ ,  $P^*$  or the biradical(s) together may form an associated biradical as designated for  $R^2$ ,  $R^{2*}$ ,  $R^3$ , and  $R^{3*}$ ;

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said pair(s) of non-geminal substituents thereby forming a mono- or bicyclic entity together with (i) the atoms to which said non-geminal substituents are bound and (ii) any intervening atoms; and

each of the substituents  $R^{1*}$ ,  $R^2$ ,  $R^{2*}$ ,  $R^3$ ,  $R^{4*}$ ,  $R^5$ ,  $R^{5*}$ ,  $R^6$  and  $R^{6*}$ ,  $R^7$ , and  $R^{7*}$  which are present and not involved in P,  $P^*$  or the biradical(s), is independently selected from hydrogen, optionally substituted  $C_{1-12}$ -alkyl, optionally substituted  $C_{2-12}$ -alkenyl, optionally substituted  $C_{2-12}$ -alkynyl, hydroxy,  $C_{1-12}$ -alkoxy,  $C_{2-12}$ -alkenyloxy, carboxy,  $C_{1-12}$ -alkoxycarbonyl,  $C_{1-12}$ -alkylcarbonyl, formyl, aryl, aryloxy, carbonyl, heteroaryl, heteroaryloxy, heteroaryl-oxy, heteroarylcarbonyl, amino, mono- and di( $C_{1-6}$ -alkyl)amino, carbamoyl, mono- and di( $C_{1-6}$ -alkyl)-amino-carbonyl, amino- $C_{1-6}$ -alkyl-aminocarbonyl, mono- and di( $C_{1-6}$ -alkyl)amino- $C_{1-6}$ -alkyl-aminocarbonyl,  $C_{1-6}$ -alkyl-carbonylamino, carbamido,  $C_{1-6}$ -alkanoyloxy, sulphonyl,  $C_{1-6}$ -alkylsulphonyloxy, nitro, azido, sulphonyl,  $C_{1-6}$ -alkylthio, halogen, DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands, where aryl and heteroaryl may be optionally substituted, and where two geminal substituents together may designate oxo, thioxo, imino, or optionally substituted methylene, or together may form a spiro biradical consisting of a 1-5 carbon atom(s) alkylene chain which is optionally interrupted and/or terminated by one or more heteroatoms/groups selected from -O-, -S-, and -(NR<sup>N</sup>)- where R<sup>N</sup> is selected from hydrogen and  $C_{1-4}$ -alkyl, and where two adjacent (non-geminal) substituents may designate an additional bond resulting in a double bond; and  $R^{N*}$ , when present and not involved in a biradical, is selected from hydrogen and  $C_{1-4}$ -alkyl;

and basic salts and acid addition salts thereof;

with the proviso that,

- (i)  $R^3$  and  $R^5$  do not together designate a biradical selected from -CH<sub>2</sub>-CH<sub>2</sub>-, -O-CH<sub>2</sub>-, when LNA is a bicyclic nucleoside analogue;

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- (ii)  $R^3$ ,  $R^5$ , and  $R^{5*}$  do not together designate a triradical  $-\text{CH}_2-\text{CH}-\text{CH}_2-$  when the nucleoside is tricyclic;
- (iii)  $R^{1*}$  and  $R^{6*}$  do not together designate a biradical  $-\text{CH}_2-$  when the nucleoside is bicyclic; and
- (iv)  $R^{4*}$  and  $R^{6*}$  do not together designate a biradical  $-\text{CH}_2-$  when the nucleoside is bicyclic.

142

~~141.~~ An oligomer of claim 140 wherein  $R^2$ ,  $R^{2*}$ ,  $R^3$ , and  $R^{3*}$  not designating  $P^*$  each designates a biradical consisting of 1-8 groups or atoms selected from  $-\text{C}(\text{R}^a\text{R}^b)-$ ,  $-\text{C}(\text{R}^a)=\text{C}(\text{R}^a)-$ ,  $-\text{O}-$ , and  $>\text{C}=\text{Z}$

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~~142.~~ An oligomer of claim 140 wherein the one or two pairs of non-geminal substituents, constituting one or two biradical(s), respectively, are selected from the present substituents of  $R^{1*}$ ,  $R^{4*}$ ,  $R^6$ ,  $R^{6*}$ ,  $R^7$ ,  $R^{7*}$ ,  $R^{N*}$ , and the ones of  $R^2$ ,  $R^{2*}$ ,  $R^3$ , and  $R^{3*}$  not designating  $P^*$ .

144

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~~143.~~ An oligomer of claim 140 wherein the oligomer comprises 1 to 10000 nucleosides of the formula I and 0-10000 nucleosides selected from naturally occurring nucleosides and nucleoside analogues, with the proviso that the sum of the number of nucleosides and the number of LNA(s) is at least 2.

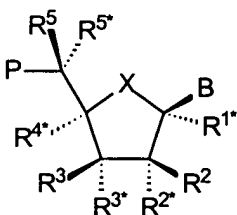
145

~~144.~~ An oligomer of claim 143 wherein at least one LNA nucleoside comprises a nucleobase as the substituent B.

146

~~145.~~ An oligomer of claim 140 wherein one of the substituents  $R^3$  and  $R^{3*}$  designates  $P^*$ .

~~147~~  
~~146.~~ An oligomer of 140 wherein one or more nucleosides have the following formula  
Ia



wherein P, P\*, B, X, R<sup>1\*</sup>, R<sup>2</sup>, R<sup>2\*</sup>, R<sup>3</sup>, R<sup>4\*</sup>, R<sup>5</sup>, and R<sup>5\*</sup> are as defined in claim 141.

~~148~~  
~~147.~~ An oligomer of claim 146 wherein R<sup>3\*</sup> designates P\*.

~~149~~  
~~148.~~ An oligomer of claim 146 wherein the oligomer comprises one biradical constituted by two non-geminal substituents.

~~150~~  
~~149.~~ An oligomer of claim 140 wherein X is selected from -(CR<sup>6</sup>R<sup>6\*</sup>)-, -O-, -S-, and -N(R<sup>N\*</sup>)-.

~~151~~  
~~150.~~ An oligomer of claim 140 wherein the biradical(s) constituted by pair(s) of non-geminal substituents is/are selected from -(CR<sup>\*</sup>R<sup>\*</sup>)<sub>r</sub>-O-(CR<sup>\*</sup>R<sup>\*</sup>)<sub>s</sub>-, -(CR<sup>\*</sup>R<sup>\*</sup>)<sub>r</sub>-O-(CR<sup>\*</sup>R<sup>\*</sup>)<sub>s</sub>-O-, -O-(CR<sup>\*</sup>R<sup>\*</sup>)<sub>r+s</sub>-O-, -O-(CR<sup>\*</sup>R<sup>\*</sup>)<sub>r</sub>-O-(CR<sup>\*</sup>R<sup>\*</sup>)<sub>s</sub>-, and -O-, wherein each R<sup>\*</sup> is independently selected from hydrogen, halogen, azido, cyano, nitro, hydroxy, mercapto, amino, mono- or di(C<sub>1-6</sub>-alkyl)amino, optionally substituted C<sub>1-6</sub>-alkoxy, optionally substituted C<sub>1-6</sub>-alkyl, DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands, and/or two adjacent (non-geminal) R<sup>\*</sup> may together designate a double bond, and each of r and s is 0-4 with the proviso that the sum r+s is 1-5.

~~151~~ <sup>152</sup> An oligomer of claim 150 wherein each biradical is independently selected from -O-,  $-(CR^*R^*)_r-O-(CR^*R^*)_s-$ , and  $-O-(CR^*R^*)_{r+s}-O-$ , wherein each of r and s is 0-3 with the proviso that the sum r+s is 1-4.

~~152~~ <sup>153</sup> An oligomer of claim 140 wherein one of the following criteria applies for at least one LNA nucleoside:

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- (i)  $R^{2*}$  and  $R^{4*}$  together designate a biradical selected from -O-,  $-(CR^*R^*)_r-O-(CR^*R^*)_s-$ ,  $-O-(CR^*R^*)_{r+s}-O-$ ,  $-S-(CR^*R^*)_{r+s}-O-$ ,  $-O-(CR^*R^*)_{r+s}-S-$ ,  $-N(R^*)-(CR^*R^*)_{r+s}-O-$ , and  $-O-(CR^*R^*)_{r+s}-N(R^*)-$ ;
  - (ii)  $R^2$  and  $R^3$  together designate a biradical selected from -O- and  $-(CR^*R^*)_r-O-(CR^*R^*)_s-$ ;
  - (iii)  $R^{2*}$  and  $R^3$  together designate a biradical selected from -O- and  $-(CR^*R^*)_r-O-(CR^*R^*)_s-$ ;
  - (iv)  $R^3$  and  $R^{4*}$  together designate a biradical of  $-(CR^*R^*)_r-O-(CR^*R^*)_s-$ ;
  - (v)  $R^3$  and  $R^5$  together designate a biradical of  $-(CR^*R^*)_r-O-(CR^*R^*)_s-$ ; or
  - (vi)  $R^{1*}$  and  $R^{4*}$  together designate a biradical of  $-(CR^*R^*)_r-O-(CR^*R^*)_s-$ ;
  - (vii)  $R^{1*}$  and  $R^{2*}$  together designate a biradical of  $-(CR^*R^*)_r-O-(CR^*R^*)_s-$ ;

wherein each of r and s is 0-3 with the proviso that the sum r+s is 1-4, and where X is selected from -O-, -S-, and  $-N(R^H)-$  where  $R^H$  designates hydrogen or  $C_{1-4}$ -alkyl.

~~153~~ <sup>154</sup> An oligomer of claim 152 wherein  $R^{3*}$  designates  $P^*$ .

~~154~~ <sup>155</sup> An oligomer of claim 153 wherein  $R^{2*}$  and  $R^{4*}$  together designate a biradical.

~~155~~ <sup>156</sup> An oligomer of claim 154 wherein X is O,  $R^2$  is selected from hydrogen, hydroxy, and optionally substituted  $C_{1-6}$ -alkoxy, and  $R^{1*}$ ,  $R^3$ ,  $R^5$ , and  $R^{5*}$  designate hydrogen.

~~157~~  
~~156.~~ An oligomer of claim 155 wherein the biradical is selected from  $-O-$  and  $-(CH_2)_{0-1}-O-(CH_2)_{1-3}-$ .

~~158~~  
~~157.~~ An oligomer of claim 156 wherein the biradical is  $-O-CH_2-$ .

~~159~~  
~~158.~~ An oligomer of claim 154 wherein B is selected from nucleobases.

~~160~~  
~~159.~~ An oligomer of claim 158 wherein the oligomer comprises at least one LNA nucleoside wherein B is selected from adenine and guanine and at least one LNA nucleoside wherein B is selected from thymine, cytosine and uracil.

~~161~~  
~~160.~~ An oligomer of claim 153 wherein  $R^2$  and  $R^3$  together designate a biradical.

~~162~~  
~~161.~~ An oligomer of claim 160 wherein X is O,  $R^{2*}$  is selected from hydrogen, hydroxy, and optionally substituted  $C_{1-6}$ -alkoxy, and  $R^{1*}$ ,  $R^{4*}$ ,  $R^5$ , and  $R^{5*}$  designate hydrogen.

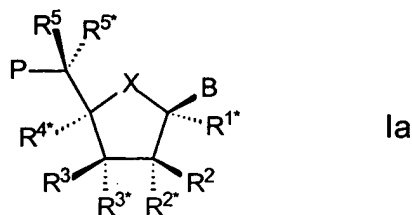
~~163~~  
~~162.~~ An oligomer of claim 161 wherein the biradical is  $-(CH_2)_{0-1}-O-(CH_2)_{1-3}-$ .

~~164~~  
~~163.~~ An oligomer of claim 153 wherein one  $R^*$  is selected from hydrogen, hydroxy, optionally substituted  $C_{1-6}$ -alkoxy, optionally substituted  $C_{1-6}$ -alkyl, DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands, and any remaining substituents  $R^*$  are hydrogen.

~~165~~  
~~164.~~ An oligomer of claim 153 wherein a group  $R^*$  in the biradical of at least one LNA nucleoside is selected from DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands.

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~~166~~  
~~165.~~ An oligomer according to claim 153 wherein one or more LNA nucleosides correspond to the formula Ia:



wherein X is -O-;

B is selected from nucleobases, DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands;

P designates the radical position for an internucleoside linkage to a succeeding monomer, or a 5'-terminal group, such internucleoside linkage or 5'-terminal group optionally including the substituent R<sup>5</sup>;

R<sup>3\*</sup> is a group P\* which designates an internucleoside linkage to a preceding monomer, or a 3'-terminal group;

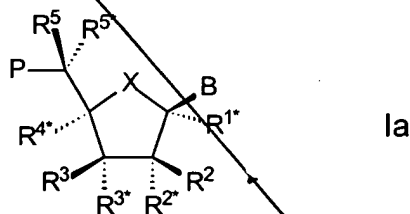
R<sup>2\*</sup> and R<sup>4\*</sup> together designate a biradical selected from -O-, -(CR<sup>\*</sup>R<sup>\*</sup>)<sub>r</sub>-O-(CR<sup>\*</sup>R<sup>\*</sup>)<sub>s</sub>- and -O-; wherein each R<sup>\*</sup> is independently selected from hydrogen, halogen, azido, cyano, nitro, hydroxy, mercapto, amino, mono- or di(C<sub>1-6</sub>-alkyl)amino, optionally substituted C<sub>1-6</sub>-alkoxy, optionally substituted C<sub>1-6</sub>-alkyl, DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands, and/or two adjacent (non-germinal) R<sup>\*</sup> may together designate a double bond, and each of r and s is 0-3 with the proviso that the sum r+s is 1-4; each of the substituents R<sup>1\*</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>5</sup>, and R<sup>5\*</sup> is independently selected from hydrogen, optionally substituted C<sub>1-6</sub>-alkyl, optionally substituted C<sub>2-6</sub>-alkenyl, hydroxy, C<sub>1-6</sub>-

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alkoxy, C<sub>2-6</sub>-alkenyloxy, carboxy, C<sub>1-6</sub>-alkoxycarbonyl, C<sub>1-6</sub>-alkylcarbonyl, formyl, amino, mono- and di(C<sub>1-6</sub>-alkyl)amino, carbamoyl, mono- and di(C<sub>1-6</sub>-alkyl)-amino-carbonyl, C<sub>1-6</sub>-alkyl-carbonylamino, carbamido, azido, C<sub>1-6</sub>-alkanoyloxy, sulphono, sulphonyl, C<sub>1-6</sub>-alkylthio, DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands, and halogen, where two geminal substituents together may designate oxo;

and basic salts and acid addition salts thereof.

<sup>167</sup>  
~~166~~ An oligomer of claim 140 wherein one or more LNA nucleosides correspond to the formula Ia:



wherein X is -O-;

B is selected from nucleobases, DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands;

P designates the radical position for an internucleoside linkage to a succeeding monomer, or a 5'-terminal group, such internucleoside linkage or 5'-terminal group optionally including the substituent R<sup>5</sup>;

R<sup>3\*</sup> is a group P\* which designates an internucleoside linkage to a preceding monomer, or a 3'-terminal group;

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$R^{2*}$  and  $R^{4*}$  together designate a biradical selected from  $-(CR^*R^*)_r-O-(CR^*R^*)_s-$  and  $-O-$ , wherein each  $R^*$  is independently selected from hydrogen, halogen, azido, cyano, nitro, hydroxy, mercapto, amino, mono- or di( $C_{1-6}$ -alkyl)amino, optionally substituted  $C_{1-6}$ -alkoxy, optionally substituted  $C_{1-6}$ -alkyl, DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands, and/or two adjacent (non-geminal)  $R^*$  may together designate a double bond, and each of  $r$  and  $s$  is 0-3 with the proviso that the sum  $r+s$  is 1-4; each of the substituents  $R^{1*}$ ,  $R^2$ ,  $R^3$ ,  $R^5$ , and  $R^{5*}$  is independently selected from hydrogen, optionally substituted  $C_{1-6}$ -alkyl, optionally substituted  $C_{2-6}$ -alkenyl, hydroxy,  $C_{1-6}$ -alkoxy,  $C_{2-6}$ -alkenyloxy, carboxy,  $C_{1-6}$ -alkoxycarbonyl,  $C_{1-6}$ -alkylcarbonyl, formyl, amino, mono- and di( $C_{1-6}$ -alkyl)amino, carbamoyl, mono- and di( $C_{1-6}$ -alkyl)-amino-carbonyl,  $C_{1-6}$ -alkyl-carbonylamino, carbamido, azido,  $C_{1-6}$ -alkanoyloxy, sulphonyl, sulphanyl,  $C_{1-6}$ -alkylthio, DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands, and halogen, where two geminal substituents together may designate oxo;

and basic salts and acid addition salts thereof.

*168*  
~~167.~~ An oligomer of claim 166 wherein one  $R^*$  is selected from hydrogen, hydroxy, optionally substituted  $C_{1-6}$ -alkoxy, optionally substituted  $C_{1-6}$ -alkyl, DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands, and any remaining substituents  $R^*$  are hydrogen.

*169*  
~~168.~~ An oligomer of claim 166 wherein the biradical is selected from  $-O-$  or  $-(CH_2)_{0-1}-O-(CH_2)_{1-3}-$ .

*170*  
~~169.~~ An oligomer of claim 166 wherein  $B$  is selected from nucleobases.

~~170.~~ <sup>171</sup> An oligomer of claim 169 wherein the oligomer comprises at least one LNA nucleoside wherein B is selected from adenine and guanine and at least one LNA nucleoside wherein B is selected from thymine, cytosine and urasil.

~~171.~~ <sup>172</sup> An oligomer of claim 166 wherein  $R^2$  is selected from hydrogen, hydroxy and optionally substituted  $C_{1-6}$ -alkoxy, and  $R^{1*}$ ,  $R^3$ ,  $R^5$ , and  $R^{5*}$  designate hydrogen.

~~172.~~ <sup>173</sup> An oligomer according to claim 140 wherein any internucleoside linkage of the one or more LNA nucleosides is selected from linkages consisting of 2 to 4 groups/atoms selected from  $-CH_2-$ ,  $-O-$ ,  $-S-$ ,  $-NR^H-$ ,  $>C=O$ ,  $>C=NR^H$ ,  $>C=S$ ,  $-Si(R'')_2-$ ,  $-SO-$ ,  $-S(O)_2-$ ,  $-P(O)_2-$ ,  $-P(O,S)-$ ,  $-P(S)_2-$ ,  $-PO(R'')$ ,  $-PO(OCH_3)-$ , and  $-PO(NHR^H)-$ , where  $R^H$  is selected from hydrogen and  $C_{1-4}$ -alkyl, and  $R''$  is selected from  $C_{1-6}$ -alkyl and phenyl.

~~173.~~ <sup>174</sup> An oligomer of claim 172 wherein any internucleoside linkage of the one or more LNA nucleosides is selected from  $-CH_2-CH_2-CH_2-$ ,  $-CH_2-CO-CH_2-$ ,  $-CH_2-CHOH-CH_2-$ ,  $-O-CH_2-O-$ ,  $-O-CH_2-CH_2-$ ,  $-O-CH_2-CH=$ ,  $-CH_2-CH_2-O-$ ,  $-NR^H-CH_2-CH_2-$ ,  $-CH_2-CH_2-NR^H-$ ,  $-CH_2-NR^H-CH_2-$ ,  $-O-CH_2-CH_2-NR^H-$ ,  $-NR^H-CO-O-$ ,  $-NR^H-CO-NR^H-$ ,  $-NR^H-CS-NR^H-$ ,  $-NR^H-C(=NR^H)-NR^H-$ ,  $-NR^H-CO-CH_2-NR^H-$ ,  $-O-CO-O-$ ,  $-O-CO-CH_2-O-$ ,  $-O-CH_2-CO-O-$ ,  $-CH_2-CO-NR^H-$ ,  $-O-CO-NR^H-$ ,  $-NR^H-CO-CH_2-$ ,  $-O-CH_2-CO-NR^H-$ ,  $-O-CH_2-CH_2-NR^H-$ ,  $-CH=N-O-$ ,  $-CH_2-NR^H-O-$ ,  $-CH_2-O-N=$ ,  $-CH_2-O-NR^H-$ ,  $-CO-NR^H-CH_2-$ ,  $-CH_2-NR^H-O-$ ,  $-CH_2-NR^H-CO-$ ,  $-O-NR^H-CH_2-$ ,  $-O-NR^H-$ ,  $-O-CH_2-S-$ ,  $-S-CH_2-O-$ ,  $-CH_2-CH_2-S-$ ,  $-O-CH_2-CH_2-S-$ ,  $-S-CH_2-CH=$ ,  $-S-CH_2-CH_2-$ ,  $-S-CH_2-CH_2-O-$ ,  $-S-CH_2-CH_2-S-$ ,  $-CH_2-S-CH_2-$ ,  $-CH_2-SO-CH_2-$ ,  $-CH_2-SO_2-CH_2-$ ,  $-O-SO-O-$ ,  $-O-S(O)_2-O-$ ,  $-O-S(O)_2-CH_2-$ ,  $-O-S(O)_2-NR^H-$ ,  $-NR^H-S(O)_2-CH_2-$ ,  $-O-S(O)_2-CH_2-$ ,  $-O-P(O)_2-O-$ ,  $-O-P(O,S)-O-$ ,  $-O-P(S)_2-O-$ ,  $-S-P(O)_2-O-$ ,  $-S-P(O,S)-O-$ ,  $-S-P(S)_2-O-$ ,  $-O-P(O)_2-S-$ ,  $-O-P(O,S)-S-$ ,  $-O-P(S)_2-S-$ ,  $-S-P(O)_2-S-$ ,  $-S-P(O,S)-S-$ ,  $-S-P(S)_2-S-$ ,  $-O-PO(R'')$ ,  $-O-PO(OCH_3)-O-$ ,  $-O-PO(BH_3)-O-$ ,  $-O-PO(NHR^N)-O-$ ,  $-O-P(O)_2-NR^H-$ ,  $-NR^H-P(O)_2-O-$ ,  $-O-P(O,NR^H)-O-$ , and  $-O-Si(R'')_2-O-$ .

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~~174.~~ <sup>175</sup> An oligomer of claim 173 wherein any internucleoside linkage of the one or more LNA nucleosides is selected from  $-\text{CH}_2-\text{CO}-\text{NR}^{\text{H}}-$ ,  $-\text{CH}_2-\text{NR}^{\text{H}}-\text{O}-$ ,  $-\text{S}-\text{CH}_2-\text{O}-$ ,  $-\text{O}-\text{P}(\text{O})_2-\text{O}-$ ,  $-\text{O}-\text{P}(\text{O},\text{S})-\text{O}-$ ,  $-\text{O}-\text{P}(\text{S})_2-\text{O}-$ ,  $-\text{NR}^{\text{H}}-\text{P}(\text{O})_2-\text{O}-$ ,  $-\text{O}-\text{P}(\text{O},\text{NR}^{\text{H}})-\text{O}-$ ,  $-\text{O}-\text{PO}(\text{R}'')-\text{O}-$ ,  $-\text{O}-\text{PO}(\text{CH}_3)-\text{O}-$ , and  $-\text{O}-\text{PO}(\text{NHR}'')-\text{O}-$ , where  $\text{R}^{\text{H}}$  is selected from hydrogen and  $\text{C}_{1-4}$ -alkyl, and  $\text{R}''$  is selected from  $\text{C}_{1-6}$ -alkyl and phenyl.

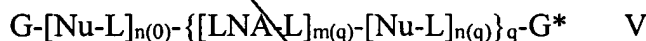
~~175.~~ <sup>176</sup> An oligomer of claim 140 wherein each of the substituents  $\text{R}^{1*}$ ,  $\text{R}^2$ ,  $\text{R}^{2*}$ ,  $\text{R}^3$ ,  $\text{R}^{3*}$ ,  $\text{R}^{4*}$ ,  $\text{R}^5$ ,  $\text{R}^{5*}$ ,  $\text{R}^6$ ,  $\text{R}^{6*}$ ,  $\text{R}^7$ , and  $\text{R}^{7*}$  of the one or more LNA nucleosides, which are present and not involved in P,  $\text{P}^*$  or the biradical(s), is independently selected from hydrogen, optionally substituted  $\text{C}_{1-6}$ -alkyl, optionally substituted  $\text{C}_{2-6}$ -alkenyl, hydroxy,  $\text{C}_{1-6}$ -alkoxy,  $\text{C}_{2-6}$ -alkenyloxy, carboxy,  $\text{C}_{1-6}$ -alkoxycarbonyl,  $\text{C}_{1-6}$ -alkylcarbonyl, formyl, amino, mono- and di( $\text{C}_{1-6}$ -alkyl)amino, carbamoyl, mono- and di( $\text{C}_{1-6}$ -alkyl)-amino-carbonyl,  $\text{C}_{1-6}$ -alkyl-carbonylamino, carbamido, azido,  $\text{C}_{1-6}$ -alkanoyloxy, sulphono, sulphanyl,  $\text{C}_{1-6}$ -alkylthio, DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands, and halogen, where two geminal substituents together may designate oxo, and where  $\text{R}^{\text{N}*}$ , when present and not involved in a biradical, is selected from hydrogen and  $\text{C}_{1-4}$ -alkyl.

~~176.~~ <sup>177</sup> An oligomer of claim 140 wherein X is selected from  $-\text{O}-$ ,  $-\text{S}-$ , and  $-\text{NR}^{\text{N}*}-$ , and each of the substituents  $\text{R}^{1*}$ ,  $\text{R}^2$ ,  $\text{R}^{2*}$ ,  $\text{R}^3$ ,  $\text{R}^{3*}$ ,  $\text{R}^{4*}$ ,  $\text{R}^5$ ,  $\text{R}^{5*}$ ,  $\text{R}^6$ ,  $\text{R}^{6*}$ ,  $\text{R}^7$ , and  $\text{R}^{7*}$  of the LNA(s), which are present and not involved in P,  $\text{P}^*$  or the biradical(s), designate hydrogen.

~~177.~~ <sup>178</sup> An oligomer of claim 140 wherein P is a 5'-terminal group selected from hydrogen, hydroxy, optionally substituted  $\text{C}_{1-6}$ -alkyl, optionally substituted  $\text{C}_{1-6}$ -alkoxy, optionally substituted  $\text{C}_{1-6}$ -alkylcarbonyloxy, optionally substituted aryloxy, monophosphate, diphosphate, triphosphate, and  $-\text{W}-\text{A}'$ , wherein W is selected from  $-\text{O}-$ ,  $-\text{S}-$ , and  $-\text{N}(\text{R}^{\text{H}})-$  where  $\text{R}^{\text{H}}$  is selected from hydrogen and  $\text{C}_{1-6}$ -alkyl, and where  $\text{A}'$  is selected from DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands.

~~179~~  
~~178.~~ An oligomer of claim 140 wherein P\* is a 3'-terminal group selected from hydrogen, hydroxy, optionally substituted C<sub>1-6</sub>-alkoxy, optionally substituted C<sub>1-6</sub>-alkylcarbonyloxy, optionally substituted aryloxy, and -W-A', wherein W is selected from -O-, -S-, and -N(R<sup>H</sup>)- where R<sup>H</sup> is selected from hydrogen and C<sub>1-6</sub>-alkyl, and where A' is selected from DNA intercalators, photochemically active groups, thermochemically active groups, chelating groups, reporter groups, and ligands.

~~180~~  
~~179.~~ An oligomer of claim 140 wherein the oligomer corresponds to the following formula V:



wherein

q is 1-50;

each of n(0), ..., n(q) is independently 0-10000;

each of m(1), ..., m(q) is independently 1-10000;

with the proviso that the sum of n(0), ..., n(q) and m(1), ..., m(q) is 2-15000;

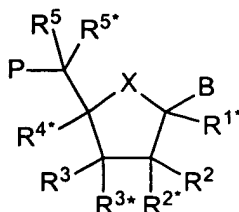
G designates a 5'-terminal group;

each Nu independently designates a nucleoside selected from naturally occurring nucleosides and nucleoside analogues;

each LNA independently designates a nucleoside analogue;

each L independently designates an internucleoside linkage between two groups selected from Nu and LNA, or L together with G\* designates a 3'-terminal group; and

each LNA-L independently designates a nucleoside analogue of the general formula I:

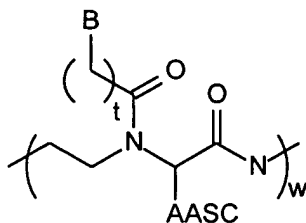


I

Sub  
DI  
CD 4  
am  
Gent

wherein the substituents B, P, P\*, R<sup>1\*</sup>, R<sup>2</sup>, R<sup>2\*</sup>, R<sup>3</sup>, R<sup>4\*</sup>, R<sup>5</sup>, and R<sup>5\*</sup>, and X are as defined in claim 140.

~~181~~  
~~180.~~ An oligomer of claim 140 further comprising a PNA mono- or oligomer segment of the formula



wherein B is as defined above for the formula I, AASC designates hydrogen or an amino acid side chain, t is 1-5, and w is 1-50.

~~182~~  
~~181.~~ An oligomer of claim 140 which has an increased specificity towards complementary ssRNA or ssDNA compared to a corresponding reference oligonucleotide which does not contain any LNA units.

~~183~~  
~~182.~~ An oligomer of claim 140 which has an increased affinity towards complementary ssRNA or ssDNA compared to a corresponding reference oligonucleotide which does not contain any LNA units.

~~184~~  
~~183.~~ An oligomer of claim 140 which is capable of binding to a target sequence in a dsDNA or dsRNA molecule by of strand displacement or by triple helix formation.

~~185~~  
~~184.~~ An oligomer of claim 140 which is more resistant to nucleases than a corresponding reference oligonucleotide which does not contain any LNA units.

~~185~~ <sup>186</sup> An oligomer according to claim 140 which has nucleic acid catalytic activity.

~~186~~ <sup>187</sup> A nucleic acid compound comprising a 2'-O,4'-C-linked nucleoside:

~~187~~ <sup>188</sup> An oligonucleotide comprising one or more 2'-O,4'-C-linked nucleoside units.

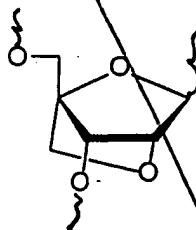
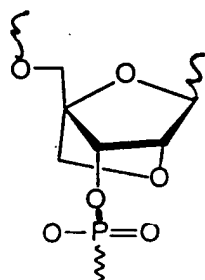
~~188~~ <sup>189</sup> A diagnostic or analysis kit comprising an oligonucleotide of claim 187.

~~189~~ <sup>190</sup> A kit of claim 188 wherein the oligonucleotide is immobilized on a solid support.

~~190~~ <sup>191</sup> A nucleic acid compound comprising a 2'-O,4'-C linked bicyclic nucleoside.

~~191~~ <sup>192</sup> An oligonucleotide comprising one or more 2'-O,4'-C-linked bicyclic nucleoside units.

~~192~~ <sup>193</sup> A nucleic acid compound comprising one or more of the following groups:



wherein the wavy lines indicates optional substitution.

~~193~~ <sup>194</sup> An oligonucleotide comprising one or more groups of claim 192.

~~194~~ <sup>195</sup> A diagnostic or analysis kit comprising an oligonucleotide of claim 193.

<sup>196</sup>  
~~195~~ A kit of claim 194 wherein the oligonucleotide is immobilized on a solid support.

<sup>197</sup>  
~~196~~ A diagnostic or analysis kit comprising a reaction body and one or more oligonucleotides of claim 140.

<sup>198</sup>  
~~197~~ The kit of claim 196 wherein the one or more oligonucleotides are immobilized on the reaction body.

<sup>199</sup>  
~~198~~ A diagnostic or analysis kit comprising a reaction body and one or more oligonucleotides of claim 146.

<sup>200</sup>  
~~199~~ The kit of claim 198 wherein the one or more oligonucleotides are immobilized on the reaction body.

<sup>201</sup>  
~~200~~ A diagnostic or analysis kit comprising a reaction body and one or more oligonucleotides of claim 156.

<sup>202</sup>  
~~201~~ The kit of claim 200 wherein the one or more oligonucleotides are immobilized on the reaction body.

<sup>203</sup>  
~~202~~ A diagnostic or analysis kit comprising a reaction body and one or more oligonucleotides of claim 165.

<sup>204</sup>  
~~203~~ The kit of claim 202 wherein the one or more oligonucleotides are immobilized on the reaction body.

<sup>205</sup>  
~~204~~ A diagnostic or analysis kit comprising a reaction body and one or more oligonucleotides of claim 166.